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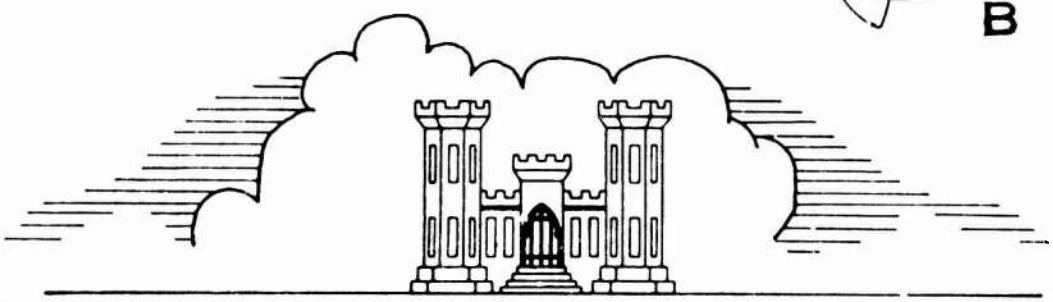
# TURKEY CREEK

## SUMTER COUNTY
## SOUTH CAROLINA

## RECONNAISSANCE REPORT









U. S. ARMY ENGINEER DISTRICT, CHARLESTON
CORPS OF ENGINEERS

CHARLESTON, SOUTH CAROLINA

JULY 1967

ACKNOWLEDGMENT AND IDENTIFICATION OF PERSONNEL

1. The preparation of the report was administered by:

Colonel Robert E. Rich, Corps of Engineers, District Engineer

Walter M. Bell, Chief, Engineering Division

Gene H. Hill, Chief, Project Planning Branch

2. This report was prepared under the direction of Edwin L. Shull, Chief, Small Flood Control Section. Dean M. Zander, John F. Murphree and John M. Saboe contributed to the report.

3. The United States Army Engineer District, Charleston, is appreciative of the cooperation rendered in connection with the study by personnel of a number of other offices and agencies, particularly the following:

City of Sumter

U. S. Fish & Wildlife Service

RECONNAISSANCE REPORT

TURKEY CREEK

SUMTER COUNTY, SOUTH CAROLINA

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DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 905, FEDERAL BUILDING
CHARLESTON, S.C. 29402

IN REPLY REFER TO
SANGP

14 July 1967

SUBJECT: Reconnaissance Report, Turkey Creek, Sumter County, South Carolina

TO: Division Engineer, South Atlantic
ATTN: SADYR

AUTHORITY

1. This reconnaissance report is submitted under authority of Section 205 of the Flood Control Act of 1948 as amended in accordance with instruction contained in ER 1165-2-12.

SPONSORING ORGANIZATION

2. The City of Sumter and Sumter County are the local sponsoring organizations. The request for this study came through a joint letter dated 6 October 1966 signed by Robert E. Graham, Mayor, City of Sumter and W. M. Hodge, Chairman, Board of Commissioners of Sumter County.

EXISTING PROJECTS

3. There are no existing or pending projects being considered on Turkey Creek by city, county, state or other Federal agencies.

DESCRIPTION OF AREA

4. Location and Description. Turkey Creek watershed is located in Sumter County in and near the city of Sumter. Sumter County is located in the upper coastal plain of South Carolina. Turkey Creek is a tributary of the Pocotaligo River which flows into the Black River. The total length of Turkey Creek is 5.8 miles. The watershed area is 5286 acres.

5. Topography. The topography of the watershed is generally flat. The 100-year flood plain varies in width from 400 feet to 3200 feet. The average ground slope along the creek is approximately 0.1 percent. The mean sea level elevation of the watershed varies from 116 feet at the Pocotaligo River to 170 feet in the upper reach.

6. Existing Channel. The existing channel has, in most cases, good depth but lacks channel capacity to carry flood waters. Silt, vegetation and debris are reducing capacity in the lower reaches. Culverts, bridges, sewer lines and water mains are further reducing capacity.

7. Land Use. Turkey Creek flood plain has various land uses. Major uses include single and multi-family residences, light and heavy industries, commercial retail and woodland. The most extensive use is residential.

8. Economic Development. Sumter has a broad economic base which is well diversified. Major industries include furniture, textiles, steel fabricating, food processing, printing and dyeing, foundry, electrical shop, and agricultural supply and marketing. In the county, non-agricultural employment from 1940 to 1965 increased from 10,912 to 20,030, an increase of 83.5%. Agricultural employment decreased from 5,215 to 2,270, a decrease of 56.5% for the period. The total work force increased 38% for the period. Per capita and per household income has shown a uniform yearly gain since 1950.

9. Population. The 1960 population of Sumter County was 74,941. The city of Sumter had a population of 20,185 in 1950 and 23,062 in 1960 which is a 14.3 percent increase. Turkey Creek 100-year flood plain has an estimated population of 1200.

10. Soils. Soils along Turkey Creek vary from heavy clays, such as Bayboro and Coxville to light sandy loams such as Goldsboro and Norfolk.

## PROBLEMS UNDER INVESTIGATION

11. The Turkey Creek channel does not have the capacity to carry flood waters. The stream readily overflows damaging homes, businesses and public properties. Some lands are not being utilized to their highest use due to hazard of flooding.

The problem is becoming more acute as Sumter and vicinity continues its rapid development.

## PRELIMINARY PLAN OF IMPROVEMENT

12. The proposed plan of improvement is for channel enlargement from the outlet at the Pocotaligo River to a point 400 feet north of East Calhoun Street. The proposed improved channel will have a 60-foot bottom at the outlet and a 16-foot bottom in the upper reach. The channel improvement will have a total length of 4.5 miles. Right-of-way requirements will vary from 200 feet in the lower reach to 100 feet in the upper reach.

## HYDROLOGY AND DESIGN

13. Rainfall and Climate. The U. S. Weather Bureau precipitation station is located in the upper watershed of Turkey Creek about 2.5 miles northwest from the center of Turkey Creek drainage area. Precipitation records at Sumter have been obtained intermittently since December 1901. Continuous records are available since October 1929. During the period 1931-1966, annual rainfall has varied from 27.11 inches (1933) to 70.69 inches (1959) and averaged 45.79 inches. Maximum rainfall for a single month was 18.02 inches which was recorded during September 1945. Forty-four percent of the average annual rainfall occurs during June through September. Mean annual temperature at Sumter is 64.5°. Extreme temperatures have varied from 7° in February to 105° in July.

14. Storms and Floods. There are no stream gaging records available for Turkey Creek. Studies of rainfall-runoff relationships indicate that minor flooding will occur between the 2 and 5-year floods. A 2-year 24-hour rainfall at Sumter is equivalent to 3.83 inches. Since 1930, the Sumter station recorded 22 events which exceeded 3.00 inches of rainfall in 24 hours. The maximum 24-hour rainfall recorded was 8.68 inches on 17 September 1945 which is about a 100-year storm. Fourteen storms ranged between 3.01 and 3.82 inches. Any one of these storms could result in some flooding, depending on antecedent conditions and storm intensity. These studies indicate that the flood problem of Turkey Creek is serious.

15. Channel Dimensions. Channel dimensions are based on backwater computations. A coefficient of 0.035 "n" was selected for the channel design and a 6-foot depth of flow was used. The channel will contain within banks a storm up to but not exceeding 10-year frequency. It is estimated that with this channel design, damages will begin with about the thirty-year frequency flood. Bottom width varies from 60 feet in the lower reach to 16 feet in the upper reach. Table 1 gives data on designed channel.

## PROJECT COSTS

16. Total Project Cost. Cost estimates are based on information from the City, County and State Highway Department engineers and from experience on similar projects. Allowance was made for contingencies, engineering and designing and supervision and administration. Total construction costs are estimated to be $129,400 and the total project costs are $213,600. Table 2 explains project costs.

TABLE 1

CHANNEL DESIGN

| Beginning Station | Ending Station | Bottom Wd. 6' Flow | Side Slope | Bottom Slope ft/ft | Elevation Beginning of Reach | Elevation End of Reach | Aver. Depth of Cut | Right-of-Way |
|---|---|---|---|---|---|---|---|---|
| 0+00 | 33+50 | 60 | 2:1 | .000808 | 112.3 | 115.0 | 4.6 | 200 |
| 33+50 | 50+50 | 60 | 1:1 | | 115.0 | 116.4 | 4.6 | 200 |
| 50+50 | 65+75 | 60 | 1:1 | | 116.4 | 117.6 | 4.6 | 200 |
| 65+75 | 83+00 | 60 | 1:1 | | 117.6 | 119.0 | 5.4 | 200 |
| 83+00 | 100+70 | 60 | 1:1 | | 119.0 | 120.4 | 7.0 | 200 |
| 100+70 | 113+90 | 55 | 1:1 | | 120.4 | 121.5 | 7.5 | 200 |
| 113+90 | 123+40 | 45 | 1:1 | .000945 | 121.5 | 122.4 | 8.5 | 200 |
| 123+40 | 145+40 | 45 | 1:1 | | 122.4 | 124.5 | 8.5 | 150 |
| 145+40 | 163+40 | 40 | 1:1 | | 124.5 | 126.2 | 7.5 | 150 |
| 163+40 | 184+90 | 35 | 1:1 | | 126.2 | 128.2 | 7.5 | 120 |
| 184+90 | 194+60 | 30 | 1:1 | | 128.2 | 129.1 | 8.5 | 120 |
| 194+60 | 201+00 | 25 | 1:1 | | 129.1 | 129.7 | 8.5 | 100 |
| 201+00 | 210+00 | 20 | 1:1 | | 129.7 | 130.6 | 9.0 | 100 |
| 210+00 | 218+60 | 18 | 1:1 | | 130.6 | 131.4 | 8.5 | 100 |
| 218+60 | 222+55 | 16 | 1:1 | | 131.4 | 131.8 | 9.0 | 100 |
| 222+55 | 239+80 | 16 | 1:1 | | 131.8 | 133.4 | 8.5 | 100 |

TABLE 2

ESTIMATED PROJECT COSTS

| | | |
|---|---|---|
| **Construction Costs** | | |
| Channel Excavation<br>227,560 cu. yds. @ $.25 | $56,900 | |
| Land Clearing - (89.4 Total Acres)<br>89.4 ac @ $350/Ac | 31,300 | |
| Spoil Shaping<br>56,890 cu. yds. @ $.06/cu. yd. | 3,400 | |
| Spoil Seeding<br>48.1 Ac @ $100/Ac | 4,800 | |
| Tree Protection | 1,000 | |
| Subtotal | | $97,400 |
| Contingencies | 14,600 | |
| Subtotal | | $112,000 |
| Engineering & Design | 10,100 | |
| Supervision & Administration | 7,300 | |
| TOTAL CONSTRUCTION COSTS | | $129,400 |
| **Land, Bridges & Utilities Costs** | | |
| Right-of-Way (89.4 Total) | | |
| 15.38 ac (Reach A) @ $100 | 1,500 | |
| 41.28 ac (Reach B-G) @ $200 | 8,300 | |
| 19.70 ac (Reach H-J) @ $800 | 15,800 | |
| 13.04 (Reach K-P @ $2,000 | 26,100 | |
| Bridge Changes | 29,300 | |
| Utilities | 3,200 | |
| TOTAL LAND, BRIDGES & UTIL. COSTS | | $84,200 |
| TOTAL PROJECT COSTS | | $213,600 |

17. Annual Charges. It is estimated that total annual charges will be $10,100 of which $1600 is for annual maintenance. Amortization is based on a 50-year project life at 3.125 percent interest. A summary of annual charges is given in Table 3.

TABLE 3

ESTIMATED AVERAGE PROJECT CHARGES

| | |
|---|---|
| Project costs ($213,600) amortized over 50-year life at 3.125 percent interest | $ 8,500 |
| Annual Maintenance - 4.5 miles @ $800 ($3600 - 2000 present expenditure) | 1,600 |
| TOTAL AVERAGE ANNUAL CHARGES | $10,100 |

PROJECT BENEFITS

18. Project benefits are derived from reduction of flood stages thereby reducing flood damages. Major damages from floods are occurring to residential, business and industrial, and public properties.

There are about 250 homes within the 100-year flood plain. Average annual damages sustained by these homes are estimated to be $6,650. Seventeen business and industrial establishments are within the 100-year flood plain. These include small grocery stores, cotton warehouses, textile plant, farm machinery, and building supply, etc. Average annual benefits to business and industrial properties are estimated to be $7,800.

Public properties include roads and bridges, sewer and water lines, and sewerage pumping stations. Seven roads and two railroads cross Turkey Creek. It is estimated that average annual benefits of $1,000 to public properties will result from the proposed project.

It is recognized that there are other benefits in addition to the ones stated above, however, they are rather minor and will be studied for the detailed report. These include loss of income due to flooding, damage to future development, enhancement of land values, relocation cost for families, etc.

TABLE 4

SUMMARY OF AVERAGE ANNUAL BENEFITS, TURKEY CREEK

| Type of Benefit | Average Annual Benefits |
|---|---|
| Residential | $ 6,650 |
| Business & Industrial | 7,800 |
| Public Properties | 1,000 |
| TOTAL | $15,450 |

19. Benefit-to-Cost Ratio. Average annual benefits are $15,450 and annual costs are $10,100. The ratio of the benefits to cost is 1.53.

20. Cost Allocation. Estimated project benefits result from reduction of flood damages. No drainage benefits are claimed because the existing channel has adequate depth for internal drainage and enough capacity for maximum one-year flows. Damage first occurs at about the 3-year frequency flow.

21. Local Cooperation. The Sumter, South Carolina City Council and the Board of Commissioners, Sumter County, South Carolina, has given assurances of local cooperation as follows:

a. Provide, without cost to the United States, all lands, easements, rights-of-way, utility relocations and alterations, and highway bridge construction and alterations necessary for project construction.

b. Hold and save the United States free from damages due to the construction works, and adjust all claims concerning water rights.

c. Maintain and operate the project after completion, without cost to the United States, in accordance with regulations prescribed by the Secretary of the Army.

d. Prescribe and enforce regulations to prevent obstructions of encroachments on the channel and rights-of-way necessary to proper functioning of the project.

e. At least, annually, notify affected interests that the improvement will not provide complete flood protection.

f. The use of lands in the flood plain below the elevation of present development will not be permitted for permanent type structures after channel improvement.

22. Cooperation with other agencies. The U. S. Fish and Wildlife Service was requested to evaluate the affect of the project on fish and wildlife. They state that they have no interest in Turkey Creek and, therefore, have no comments.

No comments have been received from other agencies.

## COST ESTIMATE FOR DETAILED PROJECT REPORT

23. It is estimated that a detailed project report will cost $10,200. Table 5 gives an itemized breakdown of costs.

TABLE 5

COST ESTIMATE FOR DETAILED PROJECT REPORT

| Uniform Cost Classification | Feature | Current Cost Estimate |
|---|---|---|
| 30.2.01 | Preliminary Planning & Public Contact | $ 600 |
| .02 | Hydrology Studies | 1,000 |
| .03 | Survey and Mapping | 1,500 |
| .04 | Materials & Foundations Investigations | 500 |
| .06 | Design & Cost Estimates | 1,500 |
| .07 | Economic Studies | 1,500 |
| .10 | Preparation of Report | 1,200 |
| .11 | Supervisions, Administration & Overhead | 1,100 |
| .12 | Contingencies | 1,300 |
| | TOTAL | $10,200 |

SANGP 14 July 1967
SUBJECT: Reconnaissance Report, Turkey Creek, Sumter County, South Carolina

CONCLUSIONS:

24. It is concluded from this reconnaissance study that Federal assistance is justified to alleviate flooding along Turkey Creek and that a detailed study under Section 205 of the Flood Control Act of 1948 as amended is warranted. Channel enlargement was found to be the only feasible plan. The enlargement should be confined to the lower 4.5 miles of the main stem of Turkey Creek.

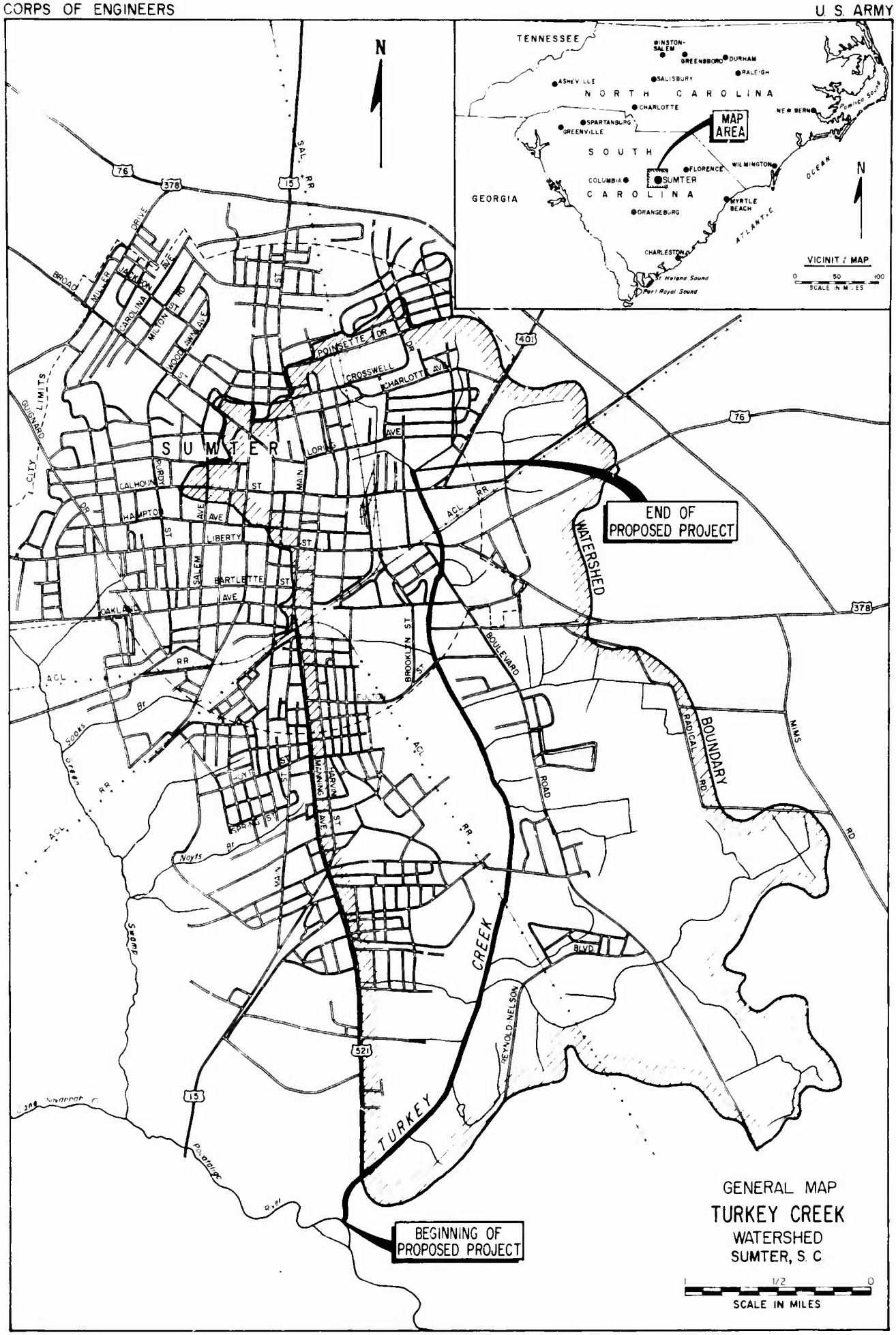
RECOMMENDATIONS:

25. It is recommended that the preparation of a detailed project report on Turkey Creek be authorized and that $10,200 be allotted for preparation of the report.

ROBERT E. RICH
Colonel, Corps of Engineers
District Engineer

CORPS OF ENGINEERS

U. S. ARMY




GENERAL MAP

TURKEY CREEK

WATERSHED

SUMTER, S. C

SCALE IN MILES